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Chapter 5 Review
Ms. Meier
Note ** Integrals can be evaluated with a calculator unless otherwise indicated**

1) Given the supply and demand functions: $D(x)=(x-9)^{2}$ and $S(x)=x^{2}+2 x+1$ where x is the units and $D(x)$ and $S(x)$ is the price in dollars, find each.
a) The equilibrium point
b) The consumer's surplus at equilibrium
c) The producer's surplus at equilibrium
d) Graph $D(x)$ and $S(x)$ and indicate all of the above.
2) An economist produced the following Lorenz curves for the distribution of total assets in the U.S. in 1963 and 1983 respectively: $L_{1}=x^{10}$ (1963) and $L_{2}=x^{12}$ (1983). Find the Gini Index for each Lorenz curve and interpret/compare the results.
3) Find the future value of an income stream where $\$ 100$ is deposited the first month and is increased by $\$ 10$ each month thereafter for 10 years and earns $6 \%$ annual interest compounded continuously.
4) You wish to have a scholarship in your name for $\$ 1200$ each year to a deserving business student, awarded indefinitely. How much should you donate, at $5.5 \%$ interest compounded continuously, to establish your scholarship?
5) A restaurant determined the length of time $t$, in minutes, that a customer must wait for an order has a probability density function of: $f(t)=0.02 e^{-0.02 t}$ for $t \geq 0$
a) Find the probability that a customer will wait no more than 20 minutes
b) Find the probability a customer must wait more than 15 minutes for an order
6) Solve the differential equations:
a) $\frac{d y}{d x}=\frac{10 x^{4}}{y}$
b) $\frac{d y}{d x}=6 x^{2}+2$ and $y=8$ when $x=0$
c) Find $\mathrm{R}(\mathrm{x})$ given $M R(x)=R^{\prime}(x)=8 x^{3}-3 x^{2}+4 x-5$ and $\mathrm{R}(\mathrm{x})=146$ when $\mathrm{x}=3$
d) $\frac{d p}{d c}=8 c^{2} p$

Answers:

1) a. $(4,25)$
b) C.S. $=\$ 101.33$
c) P.S. $=\$ 58.67$
d) Graph on window $[0,10]$ by $[0,100]$
2) Gini Index for $1963=0.818$, Gini Index for $1983=0.846$. In 1963 the distribution of total assets in the U.S. was more evenly distributed (equitable) than in 1983.
3) F.V. $=\$ 105,289.90$
4) Capital Value $=\$ 21,818.18$
5) a. Probability for wait less than 20 min. is 0.3297
b. Probability for wait more than 15 minutes is 0.7408
6) a. $y= \pm \sqrt{4 x^{5}+C}$
b. $y=2 x^{3}+2 x+8$
c. $R(x)=2 x^{4}-x^{3}+2 x^{2}-5 x+8$
d. $p=C_{1} e^{8 / 3 c^{3}}$
